THE DISTRIBUTION OF FISHES.

A GOOD illustration of the amount of change brought about by deep-sea investigations in our ideas of the distribution of the fishes is to be seen in the recent history of the Discoboli. A short time ago it was supposed all the representatives of this group — the Discoboles, disk-bearers, lump-fishes, sucking-fishes, or sea-snails, as they are variously called — were restricted to the Atlantic and Pacific, in their northern parts, and to the Arctic Ocean. This was previous to 1870. At that date species were known of each of the families of the group. From the Atlantic section there were two species of the Cyclopteridæ — Cyclopterus lumpus and Eumicrotremus spinosus — and five species of the Liparididæ — Liparis montagui, L. liparis, L. tunicatus, Careproctus major, and C. Reinhardi. And from the Pacific the list contained one species of the Cyclopteridæ, Eumicrotremus orbis, two species of the Liparopsidæ, Cyclopterichthys ventricosus and Liparops stelleri, and five species of the Liparididæ — Liparis mucosus, L. calliodon, L. Agassizii, L. pulchellus, and Careproctus gelatinosus.

Between 1870 and 1891 the additions from the Atlantic were four species of the Liparididæ — Careproctus micropus, Paraliparis bathybius, P. liparinus, P. membranaceus. In this period the northern Pacific had yielded one species of the same family, Paraliparis rosaceus. But the more important additions in this time were from the southern end of the American continent, whence came one species of the Liparopsidæ, Cyclopterichthys amissus, and three species of Liparididæ—Liparis antarctica, L. Steineni, and L. pallidus (one or more of which may yet prove to be young of Careproctus). Previous to 1891 this was the state of our knowledge of the Discoboles; and the generally accepted idea of their distribution limited them to the far-north and to the far-south, and displaced them in the tropics by other disk-bearers belonging to very distinct families, the Gobiidæ and the Gobiesocidæ. As such a number of the Discoboli were deep-sea forms, and as the anatomy in general was that of types adapted to a life far below the surface in low temperatures, there seemed to be no reason for supposing them absent from great depths under the torrid zone. These considerations induced me, in monographing the group for this museum, to predict that eventually the proper distribution would be found to extend from the northern to the most southern localities on the sea bottom (Mem. Mus. Comp. Zool., XIV., No. 2).

Since 1890 a new genus, Cyclopteroides, and new species have been added to the number of Discoboles known from the North Pacific. They, however, did not affect the distribution previously determined. It remained for the United States Fishery Commission steamer "Albatross," under Commander Tanner, to supply what was needed to verify the prediction. Among the fishes collected by this vessel while dredging off the west coast of Central America, in charge of Professor Alexander Agassiz, I find representatives of two species which place the sub-equatorial distribution beyond question. These specimens were secured within four degrees of the equator, at depths of more than 1,700 fathoms, in temperatures of about 36° F. They are figured and described in the forthcoming report on the fishes of these explorations, under the names Careproctus longifilis and Paraliparis fimbriatus. By their capture the Artarctic are connected with the Arctic localities, and the range of the Discoboli is proved to be one of the most extensive among the fishes, though the affinities and habits of those we now know are such as indicate that the present list of the species lacks much of being complete.

But the modifications of our ideas by deep-sea exploration, as will be shown in a later writing, are not confined to a particular group. Our conclusions respecting numbers of the families with which we had supposed ourselves well acquainted have been affected directly, through new species and extended ranges, and indirectly, through peculiarities of anatomical or other relationships that appear as evidences of the existence of allied forms not yet known, and of yet to be discovered centres of distribution serving as sources of replenishment for the fisheries, retreats for recovery from depletion, or as possible new grounds for our fishermen.

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Museum of Comparative Zoology, Cambridge, Mass., Mar. 7.

NOTES AND NEWS.

A NEW "Jahrbuch der Chemie" is to be issued by the German publisher, H. Bechhold, Frankfort. It will be edited by Professor R. Meyer, who has secured the co-operation of many eminent men of science. The intention is that the progress of pure and applied chemistry shall be recorded every year in a connected series of articles.

— Japan has no fewer than 700 earthquake-observing stations scattered over the Empire, and the Tokio correspondent of the London *Times* is of opinion that they are all needed. He points out that not only are the Japanese shaken up by fully 500 earthquakes every year — some of them more or less destructive — but at intervals there comes a great disaster, amounting, as in the earthquake of Oct. 28, 1891, to a national calamity. Japanese annals record twenty-nine such during the last 1,200 years.

— The volcano of Kilauea is very active at present. The cavity produced by the last breakdown has not filled up, but there is an active lake two or three hundred feet below the general level of the floor and a quarter of a mile in diameter. Rev. S. E. Bishop of Honolulu says the whole plateau of Halemanman is steadily rising. It is evidently being pushed up by lava working underneath and not built up by overflows. Professor W. D. Alexander, in charge of the Trigonometrical Survey, writes that his assistant, Mr. Dodge, will probably re-survey the crater during the coming summer, for the purpose of comparing the present topography with that delineated in *Science*, vol. ix., p. 181, 1887. The Volcano Company is constantly improving the facilities offered to visitors for inspecting the crater.

— It sometimes happens that peat bogs swell and burst, giving out a stream of dark mud. Herr Klinge, as we learn from *Nature*, has made a study of this rare phenomenon (*Bot. Jahrb.*), of which he has found only nine instances in Europe between 1745 and 1883 (seven of these being in Ireland). Heavy rains generally occur before the phenomenon, and detonations and earth vibrations precede and accompany it. The muddy stream which issues, of various fluidity, rolls along lumps of peat, and moves now more quickly, now more slowly. After the outbreak, the mud quickly hardens, and the bog sinks at the place it appeared, forming a funnel-shaped pool. The bogs considered by Herr Klinge have been almost all on high ground, not in valleys. He rejects the idea that the effects are due to excessive absorption of water by the bog. The peat layers, which often vary much in consistency, have each a certain power of imbibition, and the water absorbed does not exceed this limit. Excessive rain affects chiefly the upper layer not yet turned into peat and the cover of live vegetation, which gets saturated like a sponge, after which the water collects in pools, and runs off in streams. The theory of gas explosions is also rejected; and the author considers the real cause to lie in landslips, collapses, etc., of ground under the bog, permitting water or liquid mud to enter. This breaks up the bog mechanically, mixes with it and fluidifies it, and an outburst at the surface is the result. The limestone formations in Ireland, with their large caverns and masses of water, are naturally subject to those collapses, which, with the vibrations they induce, are more frequent in wet years. The heavy rains preceding the bog eruptions are thus to be regarded as only an indirect cause of these.